

## OPTICAL MATERIALS AND OPTICAL DEVICES

### ABSTRACT OF THE DISCLOSURE

5           Nanoscale particles, particle coatings/particle arrays and corresponding consolidated materials are described based on an ability to vary the composition involving a wide range of metal and/or metalloid elements and corresponding compositions. In particular, metalloid oxides and metal-metalloid compositions are described in the form of improved nanoscale particles and coatings formed from the nanoscale particles. Compositions comprising  
10 rare earth metals and dopants/additives with rare earth metals are described. Complex compositions with a range of host compositions and dopants/additives can be formed using the approaches described herein. The particle coating can take the form of particle arrays that range from collections of disbursable primary particles to fused networks of primary particles forming channels that reflect the nanoscale of the primary particles. Suitable materials for optical  
15 applications are described along with some optical devices of interest.